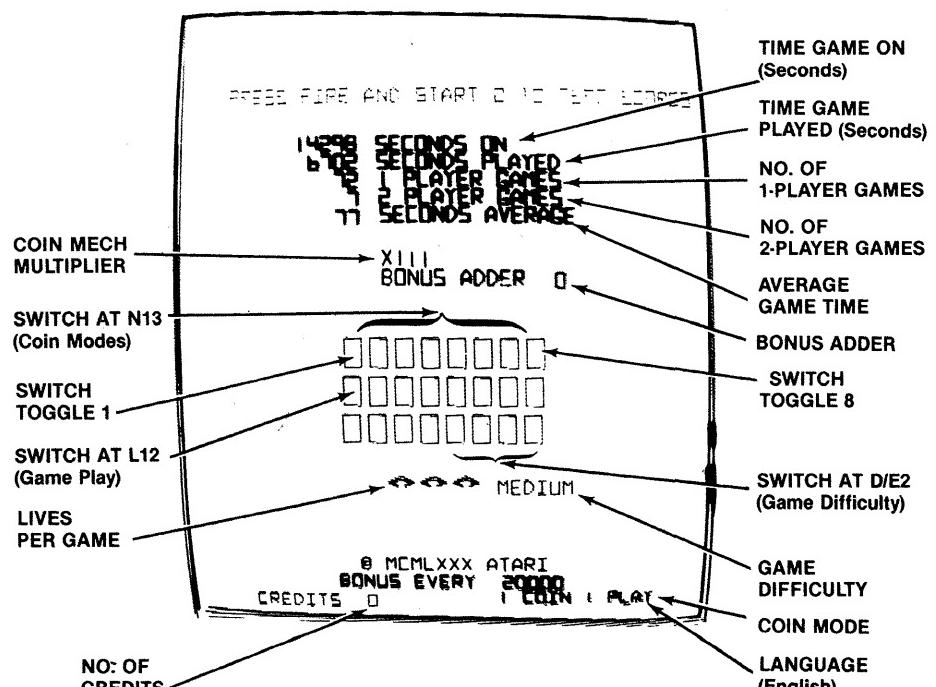


Self-Test Procedure

The information below is displayed on the screen if you set the self-test switch to **on** during the attract mode. Look at the displayed numbers for **SECONDS ON** and **SECONDS PLAYED**. If these numbers run together vertically, make adjustments to the X-BIP and Y-BIP potentiometers on the game PCB.

To go to Self-test Part 2, rotate the control knob until the message **PRESS FIRE AND SUPERZAPPER FOR SELF-TEST** appears on the monitor. Then press both FIRE and SUPERZAP PER. To end the operator information display, set self-test switch to **off**.

**Operator Information Display****To erase High Score Table:**

1. Turn control knob until top line reads **PRESS FIRE AND START 2 TO ZERO SCORES**.
2. Press both FIRE and START 2.
3. The word **ERASING** appears and blinks on the screen until the entire table is erased. Wait until the word **ERASING** disappears before continuing with other tests.

To erase Game Times:

1. Turn control knob until top line reads **PRESS FIRE AND START 1 TO ZERO TIMES**.
2. Press both FIRE and START 1.
3. The word **ERASING** appears and blinks on the screen until the entire table is erased. Wait until the word **ERASING** disappears before continuing with other tests.

Instruction	Test Passes	Test Fails
1. Set self-test switch to on . Press RESET on the PCB, or turn power off and on again.	After about 5 seconds, the monitor displays the picture below. No sounds are produced.	RAM FAILURE is indicated by a sequence of 1 to 12 tones and an R displayed in top half of screen. You will hear a short low tone and see a short flash on the LED start pushbutton for each good RAM chip, and a long high tone accompanied by a long pulse on the start pushbutton for a failing RAM chip. The test stops with the first failing RAM. To restart the sequence, press RESET on the PCB, or power game to off , then to on again. Identify the bad RAM chip with the table below. Example: four short low tones followed by a long high tone indicates failure of RAM at location M3.
ROM AT R1 IS BAD	AUDIO 1 IS BAD	ENTIRE WHITE FRAME VISIBLE AND WITHIN 1/2-INCH OF MONITOR EDGE
TOGGLE SWITCH 1	SWITCH AT L12 (Game Play)	Bad RAM Chip Location on Analog Vector-Generator PCB
SWITCH AT N13 (Coin Modes)	SWITCH AT D/E2 (Game Difficulty)	1st R2 2nd P2 3rd R4 4th P4 5th M3 6th M4 7th L3 8th L4 9th K3 10th K4 11th J3 12th J4
START 2	CONTROL KNOB	RIGHT COIN MECH
START 1	FIRE	ROM FAILURE is indicated by a vertical pair of hexadecimal numbers on the top of the screen. The top number indicates the location of the failing ROM(s). Ignore the bottom hexadecimal number in the pair. Identify the bad ROM with the table immediately below.
SUPERZAP	LEFT COIN MECH	SLAM SWITCH
UTILITY COIN SWITCH		

Displayed No.	Bad ROM Chip Location	PCB Location
B	R1	
A	P1	
9	M/N1	
8	L/M1	Analog Vector-Generator PCB
7	K1	
6	J1	
5	H1	
4	F1	
3	E1	
2	D1	
1	R3	
0	N/P3*	

EAROM, Audio and Math Box Failure are indicated by a single letter in the center of the display. Identify the failure with the table below.

Displayed Letter	Failure	PCB Location
E	EAROM	C3 (Aux. PCB)
P	Audio 1	B/C2 (Aux. PCB)
O	Audio 2	C/D2 (Aux. PCB)
R	RAM	See RAM test above
M	Math Box **	

* If this ROM is bad, you will hear a continuous low tone, and the program may be unable to display a screen image.

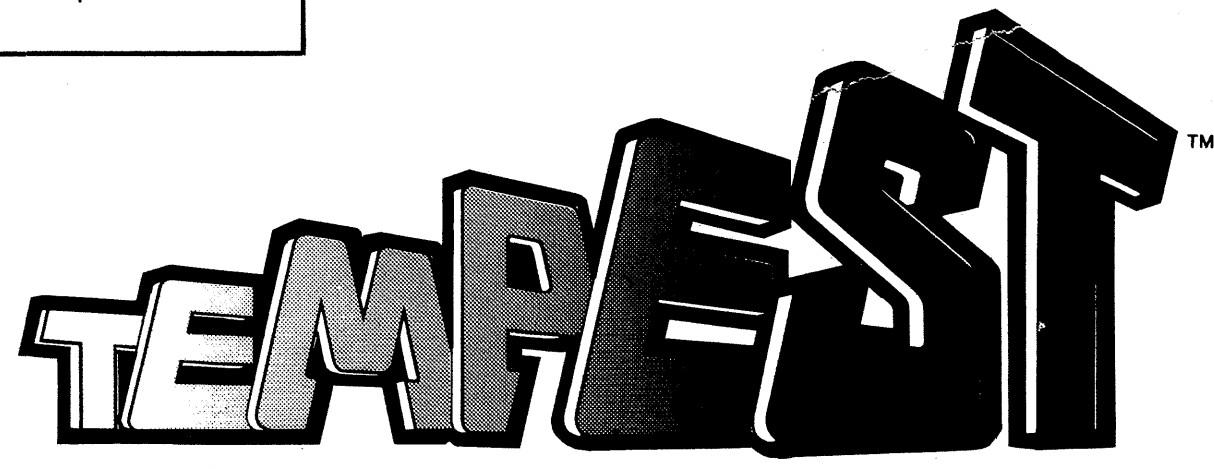
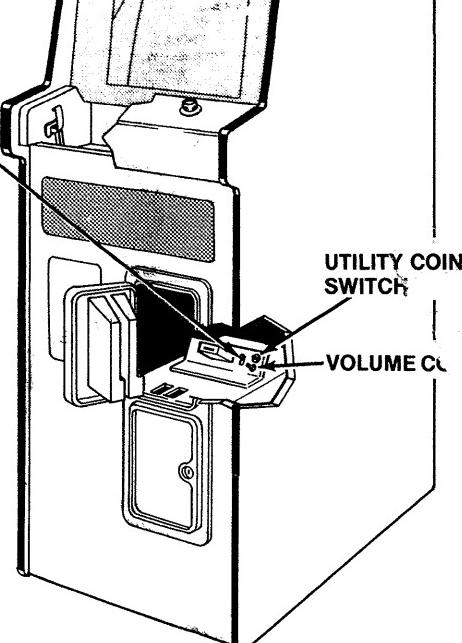
** Math-box failure is explained in TM-195, Tempest Troubleshooting Guide.

2. Activate start, fire, Superzap, SLAM, and coin switches.*	As switch activates, you'll hear a beep and 0 changes to 1 on the screen.	You will not hear a beep and 0 will remain on the screen for the defective switch.
3. Rotate encoder wheel clockwise and counterclockwise.	The right hexadecimal number on the screen will increase with counter clockwise motion, and decrease with clockwise motion.	Incorrect progression of numbers indicates encoder wheel harness wires were connected incorrectly. No number change indicates encoder wheel is bad or harness wires are loose.
4. Observe the white frame around the outside of the screen.	Each frame corner should be within 1/2-inch of each monitor bezel corner.	Consult Tempest™ Drawing Package to adjust video pots.
5. Activate SLAM switch.	A white cross hatch pattern appears. A character set appears at the bottom of the screen.	If display is not centered and symmetrical on the monitor, adjust video pots (see Tempest Drawing Package) on the main PCB. If character set is incorrect, check Vector ROMs (see Troubleshooting Guide).
6. Activate SLAM switch.	Horizontal and vertical lines cross in the center of the screen displaying a large "plus" sign. Audio I/O 1 and 2 alternate to produce four tones.	No sound indicates failure of an audio amplifier and/or the custom audio chip(s).
7. Activate SLAM switch.	Tests purple, cyan, yellow, white, green, blue, and red for color and intensity. Displays seven groups of vertical lines, each with right line the brightest and left line the dimmest.	Use this pattern for tracking adjustments (see the Color X-Y Monitor Manual).
8. Activate SLAM switch.	A checkerboard pattern touches the sides and corners of the monitor. Rotate the control knob to change color.	Use this pattern for purity and convergence adjustments (see Color X-Y Monitor Manual).
9. Activate SLAM switch.	A white frame is displayed on the screen.	
10. When satisfied with test, set self-test switch to off position.		

* Activate coin switches by inserting at least one coin in each coin slot. You will not trip the coin counters as long as you are in self-test.

Important Note to Operators:

If the operation, maintenance and service manual or troubleshooting guide was not included in this game when you unpacked it, contact your distributor to get a free copy. (All Atari manuals for coin-operated games also include complete illustrated parts lists.)

**Game Option Settings**

To change toggle positions on the switch assemblies, you need not remove the game PCB. The switches are accessible when the Tempest™ Analog Vector-Generator PCB is mounted in place. To change positions on the Auxiliary PCB slide the board out as far as possible.

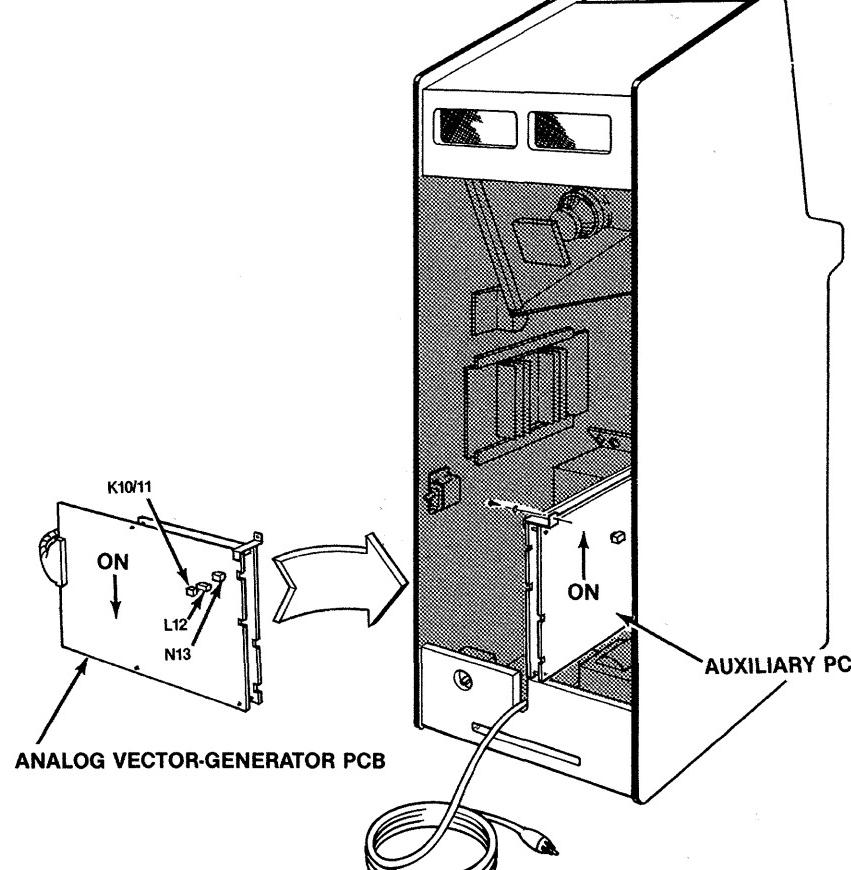
Settings of 8-Toggle Switch on Tempest Analog Vector-Generator PCB (at L12)

1	2	3	4	5	6	7	8	Option
On	On	Off	On	On	Off	On	On	1-credit minimum \$
Off	Off	On	Off	Off	On	Off	Off	2-credit minimum
On	On	On	On	On	On	On	On	English \$
Off	Off	Off	Off	Off	Off	Off	Off	French
On	On	Off	On	On	Off	On	On	German
Off	Off	On	Off	Off	On	Off	Off	Spanish
On	On	On	On	On	On	On	On	Bonus life granted at every: 10,000 points
Off	Off	Off	Off	Off	Off	Off	Off	20,000 points
On	On	Off	On	On	Off	On	On	30,000 points
Off	Off	On	Off	Off	On	Off	Off	40,000 points
On	On	On	On	On	On	On	On	50,000 points
Off	Off	Off	Off	Off	Off	Off	Off	60,000 points
On	On	Off	On	On	Off	On	On	70,000 points
Off	Off	On	Off	Off	On	Off	Off	No bonus life
On	On	On	On	On	On	On	On	2 lives per game
Off	Off	Off	Off	Off	Off	Off	Off	3 lives per game
On	On	Off	On	On	Off	On	On	4 lives per game
Off	Off	On	Off	Off	On	Off	Off	5 lives per game
Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Game difficulty*
Off	Off	Off	Off	Off	Off	Off	Off	Medium \$
On	On	On	On	On	On	On	On	Easy
Off	Off	Off	Off	Off	Off	Off	Off	Hard
On	On	On	On	On	On	On	On	Medium
Starting Level:								
1, 3, 5, 7 or 9 \$								
1, 3, 5, 7, 9 or 11 if current high score								
300,000-499,999								
1, 3, 5, 7, 9, 11 or 13 if current high score								
500,000-699,999								
1, 3, 5, 7, 9, 11, 13 or 15 if current high score more than 700,000								

\$ Manufacturer's suggested settings

* Easy—Enemies move slower and one less enemy shot on the screen at one time.

Hard—One more enemy, enemies move faster and 1-4 more enemy shots on the screen at one time.

Changing toggles 1-5 erases the high score table.**Coin Counter Option Settings**

[These toggles determine which coin mechanisms activate which counters]

Toggle Settings of 4-Toggle Switch on Analog Vector-Generator PCB (K10/11)			Two coin acceptors in the coin door:
4	3	2	1
On	Off		Both acceptors activate all coin counters simultaneously.
Not Used	Not Used	Off	Both acceptors activate 2 counters separately. \$
On	Off	Off	Both acceptors activate 2 counters separately.
On	On	On	Both acceptors activate all coin counters simultaneously. \$

\$ Manufacturer's suggested settings for games with 1 coin counter.**\$ Manufacturer's suggested settings for games with two coin counters.****Game Price Settings**

The table below contains the switch settings for options relating to game price, coin mechanism multipliers (German coin doors), bonus play, demonstration and freeze mode.

The Demonstration Mode allows you to choose any level (1-81) in the ready-to-play mode and accelerate through as many as 99 levels without having to kill the enemies. The Demonstration-Freeze Mode ** allows you to stop the action. The score is zeroed at the end of the game in this mode.

Toggle Settings of 8-Toggle Switch on Tempest Analog Vector-Generator PCB (at N13)

1	2	3	4	5	6	7	8	Option

</tbl_r